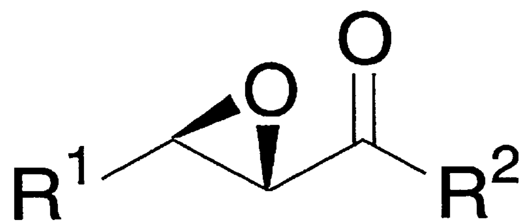
WHAT IS CLAIMED IS:

1. An optically active epoxyenone derivative of the following formula (1):



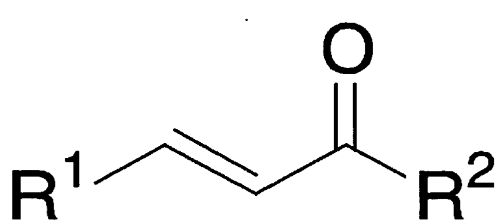
(1)

wherein R^1 is a methyl group, an ethyl group or a C_{3-10} branched, linear or cyclic alkyl group, and R^2 is a phenyl group, a substituted phenyl group or a tert-butyl group.

2. The optically active epoxyenone derivative according to Claim 1, wherein in the formula (1), R^1 is a cyclohexyl group, an isopropyl group or a n-butyl group.

3. The optically active epoxyenone derivative according to Claim 1, wherein in the formula (1), R^2 is a phenyl group, a 4-methoxyphenyl group or a tert-butyl group.

4. A process for producing an optically active epoxyenone derivative as defined in Claim 1, which comprises asymmetrically oxidizing an enone derivative of the following formula (2):



(2)

wherein R^1 is a methyl group, an ethyl group or a C_{3-10} branched, linear or cyclic alkyl group, and R^2 is a

phenyl group, a substituted phenyl group or a tert-butyl group.

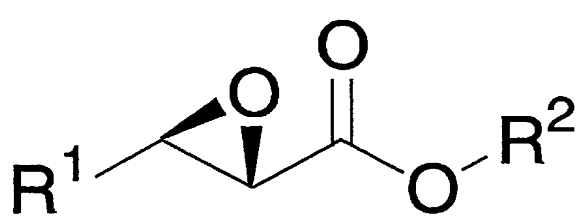
5. The process for producing an optically active epoxyenone derivative according to Claim 4, wherein in the formula (2), R^1 is a cyclohexyl group, an isopropyl group or a n-butyl group.

6. The process for producing an optically active epoxyenone derivative according to Claim 4, wherein in the formula (2), R^2 is a phenyl group, a 4-methoxyphenyl group or a tert-butyl group.

7. The process for producing an optically active epoxyenone derivative according to Claim 4, wherein the enone derivative of the formula (2) is asymmetrically oxidized by cumene hydroperoxide or tert-butyl hydroperoxide in the presence of a catalyst comprising a lanthanoid triisopropoxide, (R)-1,1'-bi-2-naphthol and triphenylphosphine oxide.

8. The process for producing an optically active epoxyenone derivative according to Claim 7, wherein the lanthanoid triisopropoxide is lanthanum triisopropoxide.

9. An optically active epoxyester derivative of the following formula (3):



(3)

wherein R^1 is a methyl group, an ethyl group or a C_{3-10}

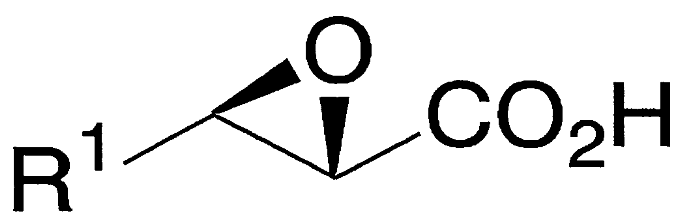
branched, linear or cyclic alkyl group, and R^2 is a phenyl group, a substituted phenyl group or a tert-butyl group.

10. The optically active epoxyester derivative according to Claim 9, wherein in the formula (3), R^1 is a cyclohexyl group, an isopropyl group or a n-butyl group.

11. The optically active epoxyester derivative according to Claim 9, wherein in the formula (3), R^2 is a phenyl group, a 4-methoxyphenyl group or a tert-butyl group.

12. A process for producing an optically active epoxyester derivative of the formula (3) as defined in Claim 9, which comprises oxidizing the optically active epoxyenone derivative of the formula (1) as defined in Claim 1 with an oxidizing agent.

13. A process for producing an optically active (2S,3R)-2,3-epoxypropionic acid derivative having a substituent at the 3-position, of the following formula (4):



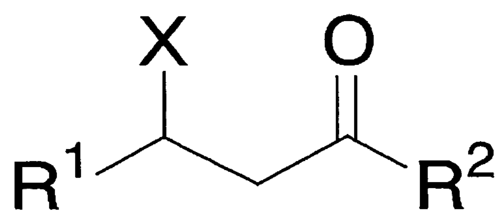
(4)

wherein R^1 is a methyl group, an ethyl group or a C_{3-10} branched, linear or cyclic alkyl group, which comprises hydrolyzing the optically active epoxyester derivative of the formula (3) as defined in Claim 9.

14. The process for producing an optically active (2S,3R)-2,3-epoxypropionic acid derivative according to

Claim 13, wherein in the formula (4), R^1 is a cyclohexyl group, an isopropyl group or a n-butyl group.

15. A 3-halogenopropan-1-one derivative having substituents at 1,3-positions, of the following formula (5):



(5)

wherein R^1 is a methyl group, an ethyl group or a C_{3-10} branched, linear or cyclic alkyl group, R^2 is a phenyl group, a substituted phenyl group or a tert-butyl group, and X is a fluorine atom, a chlorine atom, a bromine atom or an iodine atom.

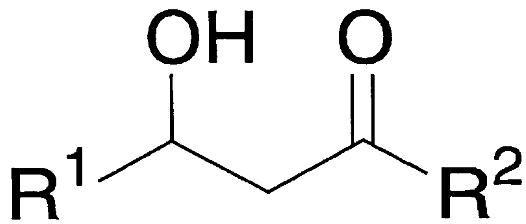
16. The 3-halogenopropan-1-one derivative having substituents at 1,3-positions, according to Claim 15, wherein in the formula (5), R^1 is a cyclohexyl group, an isopropyl group or a n-butyl group.

17. The 3-halogenopropan-1-one derivative having substituents at 1,3-positions, according to Claim 15, wherein in the formula (5), R^2 is a phenyl group, a 4-methoxyphenyl group or a tert-butyl group.

18. The compound according to Claim 15, wherein in the formula (5), X is a chlorine atom.

19. A process for producing a 3-halogenopropan-1-one derivative having substituents at 1,3-positions, of the formula (5) as defined in Claim 15, which comprises

reacting a β-hydroxyketone derivative of the following formula (6):



(6)

wherein R^1 is a methyl group, an ethyl group or a C_{3-10} branched, linear or cyclic alkyl group, and R^2 is a phenyl group, a substituted phenyl group or a tert-butyl group, with a hydrogen halide or a hydrogen halide acid.

20. The process according to Claim 19, wherein in the formula (6), R^1 is a cyclohexyl group, an isopropyl group or a n-butyl group.

21. The process according to Claim 19, wherein in the formula (6), R^2 is a phenyl group, a 4-methoxyphenyl group or a tert-butyl group.

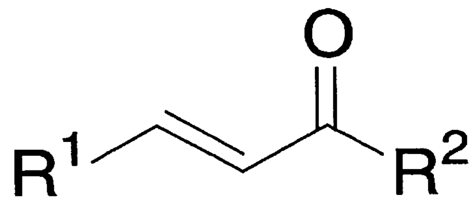
22. The process according to Claim 19, wherein 1-phenyl-3-hydroxy-3-cyclohexylpropan-1-one is reacted with hydrogen chloride or hydrochloric acid, to produce phenyl-3-chloro-3-cyclohexylpropan-1-one.

23. The process according to Claim 19, wherein 1-phenyl-3-hydroxy-4-methylpentan-1-one is reacted with hydrogen chloride or hydrochloric acid, to produce phenyl-3-chloro-4-methylpentan-1-one.

24. The process according to Claim 19, wherein 1-phenyl-3-hydroxyheptan-1-one is reacted with hydrogen chloride or hydrochloric acid, to produce phenyl-3-chloroheptan-1-

one.

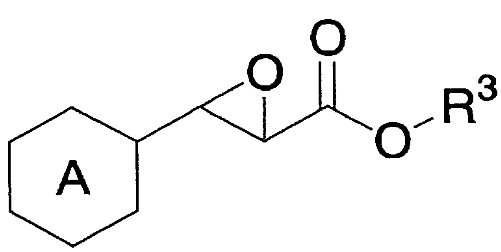
25. A process for producing an α,β-unsaturated ketone derivative of the formula (2)



(2)

wherein R^1 is a methyl group, an ethyl group or a C_{3-10} branched, linear or cyclic alkyl group, and R^2 is a phenyl group, a substituted phenyl group or a tert-butyl group, which comprises treating a 3-halogenopropan-1-one derivative having substituents at 1,3-positions, of the formula (5) as defined in Claim 15, with a base.

26. A process for producing an optically active 2,3-epoxy-3-cyclohexylpropionic acid and its ester, which comprises reacting an enzyme having an ability to asymmetrically hydrolyze an ester bond, to a mixture of a (2R,3S)-2,3-epoxy-3-cyclohexylpropionate and a (2S,3R)-2,3-epoxy-3-cyclohexylpropionate, of the 2,3-epoxy-3-cyclohexylpropionate of the following formula (7):



(7)

wherein ring A is a cyclohexyl group which may have a substituent, and R^3 is an ester residue, for

stereoselective hydrolysis, followed by separation and purification.

27. The process for producing an optically active 2,3-epoxy-3-cyclohexylpropionic acid and its ester according to Claim 26, wherein in the formula (7), the ester residue R^3 is a C_{1-10} linear, branched or cyclic saturated or unsaturated aliphatic hydrocarbon group, a C_{5-10} aromatic hydrocarbon group, an aromatic hydrocarbon group having the nucleus substituted by from 1 to 5 halogen atoms, an aromatic hydrocarbon group having the nucleus substituted by from 1 to 5 C_{1-5} alkyloxy groups, an aromatic hydrocarbon group having the nucleus substituted by from 1 to 5 C_{2-5} alkyloxyalkyl groups, a methylene group bonded with a C_{5-10} aromatic hydrocarbon group, a methylene group bonded with an aromatic hydrocarbon group having the nucleus substituted by from 1 to 5 halogen atoms, a methylene group bonded with an aromatic hydrocarbon group having the nucleus substituted by from 1 to 5 C_{1-5} alkyloxy groups, or a methylene group bonded with an aromatic hydrocarbon group having the nucleus substituted by from 1 to 5 C_{2-5} alkyloxyalkyl groups.

28. The process for producing an optically active 2,3-epoxy-3-cyclohexylpropionic acid and its ester according to Claim 26, wherein the enzyme is a lipase or an esterase.

29. The process for producing an optically active 2,3-epoxy-3-cyclohexylpropionic acid and its ester according

to Claim 26, wherein an enzyme which selectively hydrolyzes a (2S,3R)-2,3-epoxy-3-cyclohexylpropionate, is used, whereby from the aqueous phase, a (2R,3S)-2,3-epoxy-3-cyclohexylpropionic acid is obtained, and from the organic solvent phase, a (2S,3R)-2,3-epoxy-3-cyclohexylpropionate is obtained.

30. The process for producing an optically active 2,3-epoxy-3-cyclohexylpropionic acid and its ester according to Claim 26, wherein an enzyme which selectively hydrolyzes a (2R,3S)-2,3-epoxy-3-cyclohexylpropionate, is used, whereby from the aqueous phase, a (2R,3S)-2,3-epoxy-3-cyclohexylpropionic acid is obtained, and from the organic solvent phase, a (2S,3R)-2,3-epoxy-3-cyclohexylpropionate is obtained.